The Political Cost? Religious Segregation, Peace Walls, and House Prices

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Since the outbreak of civil disorder in the late 1960s, instability within Northern Ireland has borne witness to discriminatory practices relating to housing and infrastructure provision (McGarry & O'Leary, 1995). Indeed, a central tenant of The Civil Rights campaign of the late 1960s pertained to the issue surrounding discrimination in the allocation of social housing. Despite the allegations of discrimination in housing beginning to recede post 1972, the issue has remained key, moving into the post conflict setting. Having emerged out of 30 years of protracted, internal armed conflict, Northern Ireland has entered into a more stable period of self-governance and security and has witnessed considerable change in the economic, political, and cultural landscape. With economic liberalisation, institutional investment, and new strands of venture capital, new consumption space and development has been seen across the city of Belfast (Murtagh, 2011a). However, despite the emergence of a new socio-economic cleavage, gentrification, and industrial restructuring, the city has emerged unpredictably from conflict and remains a bifurcated place (Murtagh & Keaveney, 2006). Whilst the last decade observed a stabilization in ethno-religious segregation due to peace, as well as political stability and growth in the macro economy, housing market, and central business district, Belfast's post-conflict renaissance remains somewhat questionable. Issues such as multiple deprivation (the spatial distribution of deprivation or disadvantage), ethno-religious segregation, and residential fatalism (unalterable housing choices) remain. In this regard, flash-point violence, conflict, and protest have persisted, and the political environment has arguably become more polarized in light of the collapse of the devolved administration. More pertinent, Belfast remains deeply segregated, with new and reinforced interfaces and peace walls reflecting new and reasserted competition over land and housing. This is particularly evident in the provision of social housing (Nagle, 2009; Cunningham & Gregory, 2014).

Moreover, the Global Financial Crisis (GFC) and subsequent recession exposed the fragility of supply side solutions, including property-led growth and regeneration in the housing market, as a permanent mechanism of desegregation. As inferred by Murtagh (2011b), the housing boom served to culminate in the advancement of uneven urban structuring and gentrification processes, propagating new layers of residential segregation (Murtagh, 2011b). Original research by Paris et al. (1997) and Adair, McGreal, Smyth,

Cooper, and Ryley (2000b) found evidence of symmetrical land and property markets in interface areas which serve autonomous market systems. This arguably promulgates residential segregation in the private and rented housing market. The property market in the two-year period (2005-2007) preceding the GFC witnessed a period of "hyper" price inflation (178%). This growth resulted in changing migration flows and changes in the traditional housing market socio-demographic profile—namely, composition of the residential income profile. Indeed, previous research by McCord et al. (2013), building upon seminal research by Paris et al. (2007), and Adair et al. (2000b), demonstrated that the elevated pricing structure between 2004 and 2007 introduced a clear topographical submarket composition based on distance from peace walls. They illustrated that this was a consequence of the emergence of substantial modern regenerative apartment complexes or "ivory towers" in geographic areas traditionally devoid of this type of stock. Whilst these housing-led regeneration and urban renaissance strategies may have promoted urban renewal and mixed and inclusive societies, other studies have suggested that new housing developments near peace walls only serve to reinforce the established patterns of segregation and division (Gray, McAnulty, & Keenan, 2009). This changing urban profiling has attracted criticism for ostensibly galvanising established patterns of segregation and sustaining divisive barriers through "incarceration" reflected in gating and fortification (McCord et al., 2013). Moreover, Murtagh (2011b) also suggests that Belfast's post-conflict renaissance has culminated in differential socio-spatial effects that have created "re-segregation within a process of desegregation," as new segmented spaces overlie existing patterns of ethnocratic segregation (Lemon & Clifford, 2005; 2008). Indeed, Murtagh (2011a) observes that these new mixed housing spaces, developed in the high-value end of the housing market, have manifested in "class restructuring" and socio-spatial segregation, or clustering based on income, housing type, and social identity.

Despite the enclaves of renaissance littered across and within the Belfast housing market, the fractured and segregated urban landscape remains an enduring legacy of "the Conflict" complicated by social, political, cultural, religious, and security disputes (Bew, 2007; Mesev, Shirlow, & Downs, 2009). These have served to reinforce existing patterns of sectional enmity and "tribal differences," and are further aggravated by new forms of socio-spatial disadvantage and exclusion, demarcated by physical and spatial segregation. Though segregated living patterns have existed in the north of Ireland since at least the 17th Century (with the advent of the Plantation of Ulster), periods of conflict tended to herald episodes of more entrenched segregation. This "entrenched" position of segregation remains in particular

pockets across Belfast aggravating "self-reinforcing community enmity'" which has become heightened by new forms of "perceived" disadvantage.

Various streams of literature have considered paradigmatic examples and factor explanations for the spatial fragmentation of cities. Many note that urban polarisation and spatial manifestation relates to the configuration and range of political, economic, and social cleavages in the urban sphere (Allegra, Casaglia, & Rokem, 2012). Given the importance of residential segregation to the political and policy jurisdiction, it is unsurprising that a rich Northern Ireland tradition of ethnographic research has emerged, offering systematic description and critical evaluation of ethnocractic spatial practices and policy agendas (Yiftachel, 2004; Murtagh, 2002; Lloyd, Shuttleworth, & McNair, 2004). To date, much of the research carried out to examine the effects of residential segregation demonstrates that it is attendant with adverse consequences for social and economic well-being (Foster, 2001; Hall, 2010), educational achievement (Persic, 2004; Murtagh, 2011a), safety from violent crime (Boal, 1969; Hall, 2010), and conflict related deaths (Mesev et al., 2009; Cunningham & Gregory, 2014). Even as the history of exclusion, discrimination, intimidation and violent conflict has been examined, the dynamic relationship between the cause and effect remains difficult to disentangle. This highlights the challenges for investigating the mutual reinforcement of enmity and division across the housing market in areas of contested space. Furthermore, since the implementation of the peace agreements, this difficulty is complicated by new patterns of inward migration that have challenged the traditional protestant/catholic differential. Over the last fifteen years, Northern Ireland has been labelled the "race hate capital of Europe" with increasing xenophobia observed through the targeting of ethnic minorities particularly in working class Protestant areas (McVeigh, 2008). In such areas, racist violence and intimidation in the housing context has been more pronounced and seen as the manifestation of new forms of protectionism, territoriality, and fears of encroachment by "others".

As Northern Ireland moves further from the period of conflict, post-accord reconstruction has increasingly focused on the social and material vestiges of the conflict and policy response. The continuity of segregation, separation, and overt "conflict architecture" offers significant challenges for policy. Indeed, since the establishment of the new power-sharing Executive (now collapsed), the Participation and Practice of Rights organisation has argued that sectarian planning decisions are denying housing rights to people in need. (For example, see http://www.pprproject.org/right-to-housing). Boal (2008) recognized this issue and concluded, in his study that investigated territoriality across the divide in Belfast,

that future public policies toward religiously segregated residential areas need careful examination. Boal (2008) questioned to what extent urban renewal and redevelopment policy can be utilised as a de-segregating mechanism to redefine the architecture of contested space. In the discipline of public and social policy, an enhanced understanding of the effects of regulated social barriers and segregation can assist in the formulation of informed strategic, and evidence-led, policy decisions (McCord et al., 2013). In the wake of rising costs attributed to residential segregation (Hwang, 2014), it is important to formulate urban and social policies that effectively redress the negative effects of segregation, whilst at the same time remaining cognizant to the democratic rights of citizens, security, and effective use of public service provision in the face of stretched finance and austerity measures.

Research comparing the effects and cost of ethno-religious segregation in housing markets remains embryonic and critically lacking. There remains a dearth of urban economic enquiry relating to the implications of externalities (the cost or benefit that affects a party who did not choose to incur that cost or benefit), which regulate societal conformity and maintain spatial and socio-ethnic differentiation, and socio-spatial exclusion (Adair et al., 2000b; McCord et al., 2013). More important, this lacks examination of how such patterns of social practice contribute to continuing intergroup disparities in homeownership, housing allocation, and integration (Murtagh, 2011b). The research is therefore situated in the housing tradition but is highly relevant to the wider academic context of sociological and public policy discourse relating to the "costs" of residential segregation.

The existence of peace walls has been subject to continued debate, primarily as to the economic and social cost. Erected as "temporary" measures to distil the heightened civil unrest in the late 1960s, they have remained a permanent and "inherent" feature principally to help alleviate tension and conflict. In terms of the social policy context, the Shared Future Policy and the NI Executives' medium- to long-term agenda is to remove peace walls by the early 2020s. Nonetheless, extant research has illustrated that indigenous residents proximal to the walls want them retained as their removal may lead to increased social problems—posing a policy conundrum. The walls therefore present a "devil's advocate" for policy makers. On the one hand they are perceived to exacerbate territoriality and entrench segregation and economic inequality, yet alternatively they "keep the peace" and perversely attract tourism. Therefore, the walls remain somewhat of a quandary for public policy as they were a result of the animosity, were not the cause of the problem, yet simultaneously mitigate the problem and perpetuate it.

In accordance, this paper is primarily concerned with examining the "costs" of peace walls and segregation in the private residential housing market. Where segregation is most pronounced, housing policy has been criticized for accelerating spatial polarisation. As observed by Murtagh (2001), the tenacious and acute aspects of social polarization, violence, and deprivation intersect to produce "wicked" housing problems. Therefore, the research builds upon existing insights furnished by McCord et al. (2013) and examines the interactive effects of proximity to peace walls and the religious composition (segregation) of an area upon house prices. The paper proceeds as follows: a review of the literature relevant to segregation within housing markets; a description of the data and methodology used; the results presented and discussed; and finally, conclusions.

Literature Review

Market Segmentation

In recent years, an emerging corpus of research has investigated the structure and operation of urban housing markets, submarket structures, and market segmentation. The literature pertaining to submarkets suggest that the idiosyncratic characteristics and genetic make-up of urban municipalities and determinants of housing come together to create very specific, complex, and localised housing submarket structures. Indeed, recent literature has increasingly acknowledged both spatial and structural factors (Leishman, 2001), behavioural and cultural choice as a consequence of socio-economic and locational preferences (Kauko, Hooimeijer, & Hakfoort, 2002), and the importance of segmentation in determining submarket existence (Adair, Berry, & McGreal, 1996; McCord et al., 2013).

The complex and often nested form of market structures is distinctive in regions with a history of conflict related violence. This is recognised in a growing tradition of research which has demonstrated the casual relationship between ethno-religious conflict and both residential property value (Gambo, 2012; Aliyu, Kasim, Martin, Masirin, & Idrus, 2012; McCord et al., 2013) and economic outcomes (Blomberg & Hess, 2002; Abadie & Gardeazabal, 2003; Abadie & Dermisi, 2008; Zussman, Zussman, & Nielsen, 2008). In the context of Northern Ireland, O'Hearn (2008) has noted the effect of peace on the Northern Irish economy, and research by Besley and Mueller (2012) has estimated the impact of the peace process on house prices—highlighting a negative correlation between politically-motivated killings and house prices. With regard to religious apartheid (separation of people according to their religion) and market structure, residential segregation is recognized as a multidimensional concept (Massey et al., 1987) that generally describes the physical separation of two groups as a consequence of supplier price discrimination limiting the

housing choices, or of prejudicial attitudes among consumers that lead to an equilibrium separation (Kiel & Zabel, 1996). However, other origins of segregation exist in property markets, from non-price discrimination practices and territorial or density coercion that limit the neighbourhood choice. Whatever the source of the segregation, economic theory predicts that the exclusion itself could generate inter-neighbourhood housing price differentials (Myers, 2004). In Northern Ireland, the effect of ethno-religious affiliation on market logic is reflected in empirical research by Adair et al. (1994, 2000a). The authors drew on housing search behaviour data to demonstrate how the processes of segregation have affected the operation of the private residential market—noting heterogeneous market structures in areas of ethnic residential segregation. Similarly, McPeake (1998) demonstrated that Catholics had distinctive search patterns, involving a longer search pattern but in a narrower range of areas, than their Protestant counterparts.

In housing markets where segregation is the product of regulated social barriers and replicated patterns of spatial and socio-ethnic differentiation, there is a paucity of urban economic research that explores pricing differential effects of segregation on property value. The modus operandi of walls as overtly political and related to the configuration and regulation of social edifices has been explored in the seminal work of Davis (1986, 2000, 2002). His work considered the spatial and socio-ethnic segregation of socially excluded and marginalised groups across major urban centres in the U.S. In a similar context, other research has examined the emerging employment and function of gated and walled communities as a means of societal conformity and differentiation premised on wealth, race, and ethnicity (Blakeley & Snyder 1995; Vesselinov, Cazessus, & Falk, 2007). More recently, research by McCord et al. (2013) empirically analysed the proximal effects of peace walls on house prices in the Belfast housing market. The authors highlighted that although there appears to be a significant pricing effect with the distance to negative externalities of peace walls, the effects of such hard barriers do not affect the value of property types in a uniform fashion across space and distance. This is an important finding for understanding the complex spatial composition of housing submarkets and the issues pertaining to market valuation and segmentation.

Segregation in Northern Ireland

In the popular view, segregation in Northern Ireland society is essentially viewed through the scope of residence, although it exists in other daily aspects of life, namely education, sports, cultural activities/practices, and historically, employment. Belfast is perceived as an ethnocratic city and complex mosaic of segregation (Boal, 1994; Shirlow &

Murtagh, 2006) which is the vestige of the historical retreat of isolated minority households into their respective ethnic heartlands during episodes of inveterate conflict, violence, fear, and cultural conflagration (Poole & Doherty, 1996). In situations of ethno-political conflict, residential segregation is a ubiquitous and ensconcing contributor to primordial intergroup tension and conflict (Schmid, Tausch, Hewstone, Hughes, & Cairns, 2008). The contemporary Belfast hinterland therefore reflects a stable montage of segregated housing, which is, in the comparative urban context, perpetuated by the mutual impact of violence and segregation. Since the late 1960s, the principal function of ethnic residential segregation in the urban environment has been a provision for physical defence and protection from violence, intimidation, or the fear of threat (Peach, 1996b; Shuttleworth & Lloyd, 2008), which has been crucial in driving changes the geographical distribution of the population (Lloyd et al., 2004). Indeed, across the assemblage of ethno-national enclaves, physical detachment is part of social and spatial practice to protect from fear and violence, yet simultaneously reinforcing identity and territorial ownership (Shirlow & Murtagh, 2006). Territoriality and segregation escalate at times of violence where the increased sense of insecurity consolidates heterogeneous, segregated ethnic environments, which further upholds atavistic attitudes, sustains violence, and encourages group isolation between spatially divided populations (Poole & Doherty 1996; Byrne, 2006b). The ontology of ethno-violence, security, and cultural territoriality have therefore sculpted an urban mosaic of inverse residential environments related to ethnic affiliation and promulgated by inherited patterns of geographical separation and social distance (Doherty & Poole, 1997; Muir, 2012). This spatial segregation and ethno-religious polarization has reinforced the replication of environmental, social, and ideological segregation in other apparatus and institutions—evident in the "duel landscape" and inefficiencies of largely parallel systems and structures for education, housing, social life, and sporting and leisure pursuits (Byrne, Hansson, & Bell 2006a; Nolan, 2014). Nonetheless, ethno-religious cleavages must also be understood in the context of social stratification. In the Belfast context, the tenor of research also indicates a strong covariance between social class and high levels of residential segregation and dissimilarity, particularly working-class areas characterised by higher levels of multiple deprivation (Boal, 1982; Shirlow, 2001; Schmid et al., 2008; Murtagh, 2011b). This accords with other international contexts and clearly indicates that working class communities and areas of social housing are the most extensively segregated and susceptible to the pressures maintaining and nourishing further segregation.

Residential segregation and associated urban interfacing has long been the most visible and distinguishable feature of the fractured urban environment and is observed most clearly through the proliferation of "peace walls"[1] to demarcate "the intersection of segregated and polarised working class residential zones in areas with a strong link between territory and ethno-political identity" (Jarman, 2005). Such physical barriers and conflict-related architecture have become part of the conflict society lexicon, and are typically diverse and archetypally distinctive entities that visibly demarcate ethno-sectarian property boundaries and barriers implicated in urban planning, development, and social negotiation of space across the Belfast metropolitan area (McAtackney, 2011; McCord et al., 2013). Whilst these edifices may seem as socially retrograde in a period of "peace", approximately 100 walls and fences now exist as an embedded, implicit policy response to keep communities apart, serving as a physical reminder that hostility and fear have not yet disappeared (Jarman, 2012; Byrne, Gormley-Heenan, Morrow, & Sturgeon, 2015). As such, there is tacit acceptance that social housing estates in the Belfast hinterland are effectively divided into exclusively Catholic or Protestant areas mostly by peace walls (Birrell, 1994; Jarman & O'Halloran, 2001; Nolan, 2014) with 91% of Belfast's social housing estates populated by more than 80% of either Protestant or Catholic households (Shuttleworth & Lloyd, 2007). Profound legacy is produced in the permanency and institutionalisation of residential segregation (Hepburn, 2001; Murtagh, 2011a), with approximately 35% to 40% of the population residing in completely segregated neighbourhoods (Poole & Doherty, 1996). Moreover, the immediate environment contiguous to peace walls is often characterised by derelict housing, urban decay (Persic, 2004), and much of the land and property within segregated space is adversely affected, which presents major obstacles to the vitality of the housing market. Included are high rates of socio-economic deprivation, violence and crime, urban blight, sectarian imagery and physical dereliction, and the reproduction of segregated space through symmetrical and self-contained property markets (Shirlow, Murtagh, Mesev, & McMullan, 2003; McCord et al., 2013).

The relationship between the spatial concentration of the population and housing policy, in a variety of contexts, is of substantial interest for urban governance and gentrification. As the deconstruction of territoriality and diversity of housing choice have become increasingly important in ethnocratic states (Maginn, 2004), debates pertaining to spatial ethnicity, integrated housing markets, and urban regeneration have emerged as a

[1]For the purposes of this paper, the term *peace walls* is used to reference a variety of interfaces, including walls, gates, and security barriers.

significant policy discourse in Northern Ireland (Murtagh, 2011a; Muir, 2012). The persistence of segregation and separation in Northern Ireland has left significant challenges for policy-makers. Indeed, as policy-makers contend with new and diverse forms of social exclusion, issues of ethnicity and spatial deprivation, housing management, policy, and planning have become an important policy tool. More recently, narratives of a transformative society, and positive discourses relating to legacy of sectarianism and territoriality in Belfast (Aughey, 2005), have highlighted at a strategic level, the use of housing to promote social integration and cohesion to tackle the effects of residential segregation. In this context, a key policy objective is to foster development that contributes to community relations and reduces socioeconomic differentials to facilitate, *inter alia*, the development of integrated communities and encourage social intercourse in areas where communities are living apart (Gray et al., 2009). One suggested vehicle to action in the delivery of this agenda is the removal of existing physical barriers between communities. This is reflected most recently within the *Together: Building a United Community (TBUC)* strategy, which targets the removal of all peace walls by 2023—taking into account, *inter alia*, community engagement and consensus in the phased removal of barriers and issues of personal and property safety (TBUC, 2013). Attitudinal evidence from those who reside closest to the peace walls suggests that support for the removal of peace lines has declined in recent years, and that they remain necessary for protection from violence (Byrne et al., 2015). Notwithstanding this, criticism has also been directed at indigenous, post-conflict governance and land use policy, which has largely failed to tackle the spatial effects of residential segregation (Bolt, Phillips, & Van Kempen, 2010).

Of course, in the local context, the intersection of residential segregation with law and policy has also been manifest with debate pertaining to inequality, marginalisation, and exclusion of ethnic minorities such as Travellers[2] and immigrants. Whilst scholastic and policy debate endures—as relates to assimilationist, sedentarist, and racist ideas and practices in contemporary policy, including housing—towards Travellers (McVeigh, 2008), it is also important to acknowledge that the debate encompassing the potential effects of Traveller sites on contiguous property value also remains largely anecdotal and under-researched. Similarly,

[2]Travellers are defined as: "Persons of nomadic habit of life whatever their race or origin, including such persons who on grounds only of their own or their family's dependents' educational or health needs or old age have ceased to travel temporarily or permanently, but excluding members of an organised group of Travelling Show-people or circus people travelling together as such."(Planning Policy for Traveller sites, CLG, March 2012.) Irish travellers are recognised in law as distinct ethnic groups and legally protected from discrimination under the Equalities Act 2010. All travellers, including New Travellers, have their right to roam protected by Human Rights Legislation, by the Housing Act 2004, the Planning and Compulsory Purchase Act 2004 and the Children's Act 2004.

increasing trends of xenophobic violence and intimidation in the housing context further highlight the challenges confronting the need to evidence residential segregation and housing policy.

Significant challenges remain as the nature of segregated housing dictates a complex and vexed relationship between the demand and supply fundamentals in proximate areas of contested space (Boal, 1996). This territorial scenario has created a position in some areas of Belfast whereby many Protestant areas are under-occupied or redevelopment schemes have left vacant areas, whilst in neighbouring Catholic areas there remains a heavy demand for new houses and a greater density of population (Jarman, 2002). These market mechanics have arguably induced greater community isolation and fragmentation, highlighting tension between the dismantlement of the old ethnocracy through the conduit of social and housing policy, on community cohesion and the emerging debate relating to the removal of peace walls, balanced against fundamental housing and citizen democratic rights and practices. Indeed, there is some credence to the view that conceptual methods of cohesion and transformation are not viable in ethnically divided spaces where polemical strategies provide a firmer basis for citizens to advance their claims and rights (Murtagh & Ellis, 2011). Arguably, such issues highlight the need for bespoke evidence-led, and empirically informed policy tools and strategies, to tackle the effect of housing segregation, exclusion, and systems of social replication.

Data and Methodological Framework

Existing analysis has often tended to rely on the "perception" of peace walls, utilising (bias) perception of core issues such as fear and marginalisation that affects the indigenous populations, with limited analysis scrutinising the impacts upon the living environment and economic effects. The current challenges within government, as to the "effects" of peace walls, have witnessed a renewed invigoration over the past five years. The government has recently undertaken a wholesale investigation to quantify the wholesale "removal" of peace walls and to regard their economic and social value, particularly upon the local community.

The existence of peace walls has manifested in the sustained demarcation of communities and arguably exacerbated multiple deprivation and inequality. Peace walls have acted as a magnet for repelling "normal" market processes, and they are an everyday symbol of the past conflict, serving to entrench mind-sets on a continual basis and prohibiting society from "moving on". In this era of heightened focus on community-based (policing) solutions, they unsurprisingly serve as a somewhat anachronistic symbol of the failures of the past. To help contextualise and offer a more "economic" quantification of the existence of peace

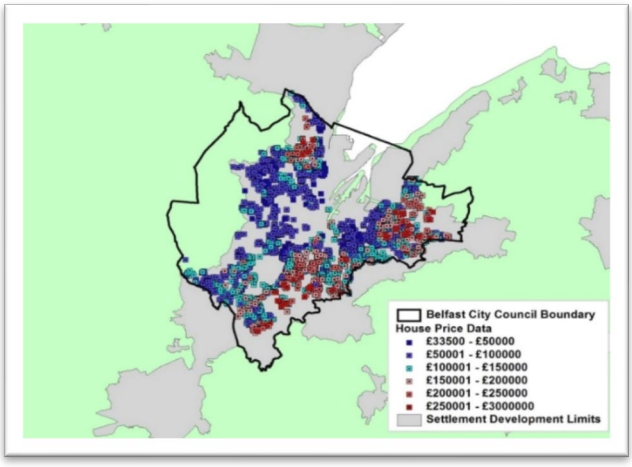
walls, this research attempts to establish the nature and direction of the effect, or simply put, to investigate how housing market pricing effects may signal attitudes and opinions of the population towards the peace walls. A hypothesis is envisaged that house prices indicate the more general perception of peace walls and the associated dis-amenity impact. This research therefore utilises a representative sample of property market activity (namely a house sales price database augmented with socio-economic and physical attributes related to location) and attempts to identify the statistical proximity effect for predominantly catholic and protestant communities at various distances from the peace walls.

Data

The house price information is derived from the Belfast housing market, comprising 3,842 sales transactions over the year period 2014 (**Figure 1**). This period was selected as it reflects what was arguably the first time the housing market reflected a pricing stability and equilibrium in terms of normal market behaviour post Global Financial Crisis. In addition, this period was stable in terms of a functioning political environment with the devolved administration. The initial dataset comprising 3,993 observations was examined for outliers and anomalies applying Cook's measure and standardised statistical steps and procedure. Cook's distance identifies cases that are influential or have a large effect on the regression solution and may be distorting the solution for the remaining cases in the analysis.

Problematic cases were identified employing the following criteria formula: $4/ (n - k - 1)$, where n is the number of cases in the analysis and k is the number of independent variables. In addition, missing observations were removed along with those that were evidently incorrect as a consequence of erroneous data entry.

Figure 1. Sales Transactions across the Belfast Housing Market



To capture and control for accessibility, services, and important amenities, distance calculations were ascertained using ArcGIS with the *X, Y* coordinates of each property sales observation. Census tract data was sourced from the Northern Ireland Neighbourhood Information Statistics (NINIS) and Northern Ireland Statistical Research Agency (NISRA). At the census geography, where feasible, Output Areas (OAs)[3] [the lowest level geographic information], were utilised to account and provide for specific demographic, socio-economic characteristics (deprivation, income, employment), and population.

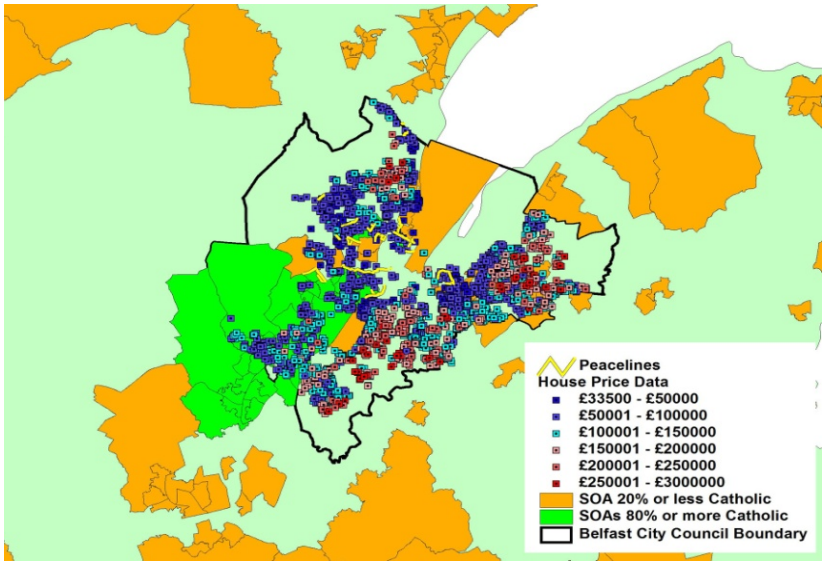
With regard to market segregation and specifically applying a definition, what constitutes a segregated area has nevertheless proven difficult, and a number of definitions have been employed. There is a long history of interest in residential segregation by religion in Northern Ireland (Lloyd, 2010), and a volume of ethnographic research has emerged over the last generation, which has highlighted that the understanding and measurement of segregation are numerous and varied. Segregation is a labile and amorphous concept (Poole & Doherty, 1996; Peach, 1996a; Cunningham & Gregory, 2014), the subjective modalities of which raise pertinent enquiry as to the extent that it can be conceptualised and measured in societies emerging from conflict (DeMarco & Galster, 1993; Kliot & Mansfeld, 1999; Shuttleworth & Lloyd, 2008). Similarly, in Northern Ireland, defining what constitutes residential segregation has proven complex and problematic with a number of threshold definitions advanced. Boal (1976) argued that a mixed area should contain more than 10% of residents from the minority community, while areas that were either 90% or more Protestant, or 90% or more Catholic, should be categorised as segregated. However, Doherty (1990) referred to a segregated area as having a majority population of over 80%, and thereby areas with a minority population of between 20-80% were considered “mixed”. The Northern Ireland Housing Executive adopted the 10% minimum threshold in their definition of segregation (NIHE 1999; Jarman & O’Halloran, 2001), although more recently Murtagh and Carmichael (2008) have argued for a higher minority threshold and concluded that segregated wards were taken to have a majority community background of more than 70%, whilst mixed wards were deemed to be outside these parameters. This generally accords with literature from the U.S., where Rose (1971) defined the core neighbourhood as having 75% or more blacks and the fringe ghetto neighbourhood as having 50–74%. In a more recent study, Farley, Steeh, Jackson, Krysan, & Reeves (1993) showed that the tipping point in Detroit had

[3]OA’s are computer-generated and intended to be of uniform population size, take account of postcode and ward boundaries and to be as socially homogeneous as possible. The 5,022 Northern Ireland OAs contain an average of 336 persons and 125 households. The minimum threshold for publication of census data was 100 persons and 40 households.

shifted from a 30% black neighbourhood in 1976 to 40% in 1992. For the purposes of this research segregation composition based on religious orientation is defined as areas comprising >80% catholic populace, (herein after predominantly catholic), <20% catholic populace (predominantly protestant), or mixed neighbourhoods derived[4] (**Figure 2**).

Where appropriate, the Euclidian distance measures were transformed into distance band dummy variables. This was a necessary step in order to capture the religious composition of the market and the sales information, in order to band each respective segregated market and the distance "each side" of the peace wall. This step also served to ensure sampling adequacy for the hedonic modelling stage. The variables utilised in the statistical analysis are evidenced in **Table 1**. Where applicable, the variables have been transformed into binary format.

Figure 2. Defined Segregated Market Areas, Peace Walls, and House Prices



[4]The approach is premised on the Office of National Statistics (ONS) research and protocol which defines the values of percent religion that are utilised to define segregated markets.

Table 1

Variable Descriptives

Variable	Description	Type
Price	Sale Price in pounds sterling (£)	C
Area	Size of the property in m^2	C
Type	Property type	B
Class	Whether the property is public or privately constructed	B
Bedrooms	Number of bedrooms	B
Heating Type	Type of heating	B
Garage	Whether the property has a garage	B
Ward Location	Ward in which the property is located	B
Multiple Deprivation	Level of multiple deprivation (deciles) (OA Level)	B
Crime Level	The number of recorded crime incidents (Ward Level)	C
Unemployment	Unemployment rate (Ward level)	C
Religious segregation	Level of religious composition (OA Level)	B
Peace Wall Distance	Distance to the nearest peace line (in bands)	B
CBD Distance	Distance to CBD [edge of CBD perimeter] (in bands)	B

**B: Binary; C: Continuous*

Model Development

Price modelling in housing markets traditionally applies hedonic pricing modelling originally pioneered by Lancaster (1966) and Rosen (1974). This assumes that utility-bearing characteristics and the implicit price of property attributes can be revealed from the observed prices of differentiated products—and the quantities of characteristics associated with them. This hedonic price schedule therefore reflects the locus of tangencies between the households' utility functions and external cost functions, which reflects the flow of housing services, based on a demand and supply equilibrium framework. Price is determined by the vector of the dwelling's characteristics, which are often decomposed in a vector of structural, accessibility, and neighbourhood variables. On the demand side, key factors are typically economic (income), demographic, and labor market factors, with supply-side macroeconomic, financial, and borrowing-driven. By unbundling the housing product, it is possible to assess the (implicit) value that individuals are revealing by their (explicit) choice in the housing market (Sheppard, 1999). Therefore, what determines the fundamental value of house prices in the short-, medium-, and long-term is

governed by a litany of wider market characteristics that reflect local heterogeneous market conditions. Thus, patterns of house prices (spatially) are impacted upon by endogenous (implicit housing characteristics) and exogenous (positive and negative) externalities. These local (dis)amenities impact upon house price dynamics and play a significant role in determining choice. In the context of housing literature, amenities are syntactic concerns, and hedonic methods with spatial analyses have gained popularity by their ability to provide estimates of the proximity "effect" of a variety of positive and negative environment-specific externalities on property prices (Des Rosiers, Bolduc, & Thériault, 1999). Indeed, over the past four decades, a plethora of studies have reported significant positive and negative effects on house price from a variety of proximate locational externalities inferring that the value of a specified (dis)amenity is at least partially captured in the price of residential properties proximate to it (Crompton, 2001).

Hedonic Modelling

As illustrated, hedonic modelling is the orthodox technique applied within property analysis to ascertain the marginal effects of property attributes. The essence of hedonic price modelling is to capture the relationship between house prices and housing attributes. Typically, as identified in the seminal writings of Rosen (1974) the basic form of the house price model is the functional relationship between the price P of a heterogeneous good i and its quality characteristics represented by a vector $\boldsymbol{x}_i$:

$$P_i = f(\boldsymbol{x}_i;\, \boldsymbol{\beta}) + u_i \quad (1)$$

Where $P_i$is a property with a price P, $\boldsymbol{x}_i$ is the structural attributes of size and quality, and also attributes of the neighbourhood in which the property is located (indicators of the adjacent environment and accessibility), $\boldsymbol{\beta}$ relates to the vector of coefficients which are estimated for the characteristics, with u_i representing the error term.

Given that the hedonic price function is an envelope function, there is no theoretical guidance for its specification. In the absence of clear guidance, it is appropriate to test several functional forms and utilize a multiple regression equation. Cropper, Deck, and McConnell (1988) examined common functional form choices and found that simpler forms for the hedonic price function performed best when some attributes of housing are unobserved by the researcher or measured with error. The non-linear (semi-log) model is utilised as this standardizes the pricing distribution which is the normal approach for pricing studies

(removes statistical bias in terms of statistical significance), thereby accounting for non-linearity within the pricing structure. In this regard, the semi-log hedonic specification can be applied:

$$In(P_i) = \alpha + \sum_{j=1}^{J} \beta_j z_{ji} + e_i$$

(2)

where the natural log of the i^{th} house is a function of the J characteristics assumed to influence price, α and β the coefficients estimated, and e the normally distributed error term. When employing the semi-log specification, the functional form facilitates the evaluation of the percentage effect. As highlighted by Halvorsen and Palmquist (1980) for the semi-log model specification capturing the true percentage change of a dummy variable is:

$$g = 100[\exp([\alpha]) - 1]$$

(3)

Where, the relative effect on the dependent variable of the presence of the factor represented by the dummy variable bn. For example, model specification encompassing dummy variables included take the form:

$$InP_{knmt} = \beta_0 + \beta_1 S_k + \beta_2 N_n + \beta_3 Cath_n \ldots\ldots \beta_n + \varepsilon_{knmt}$$

(4)

The $\Delta Cath$ =100 [exp ([α]) -1] is the average percent difference in price for a one percentage point increase in the percent catholic within the neighbourhood. This percentage effect measure therefore equalizes/standardizes the change in price relative to the neighbourhood structure. This is extended in line with the "border" model developed by Bailey (1959). The general assumption in terms of racial preference and segregation as outlined in Rose-Ackerman (1975) and King and Mieszkowski (1973) is that non-whites prefer to live near whites, whilst whites prefer to not live near non-whites; the result is a perfectly segregated city based on a bid-rent function premised on preference. In other words, the situation is non-whites living in the centre, with whites living in the suburbs, and the border area will have the same price paid by both whites and non-whites. For example, King and Mieszkowski (1973) show:

$$\begin{aligned} InP_{knmt} = {} & \beta_0 + \beta_1 S_k + \beta_2 N_n \\ & + \beta^{nw}_{NONW} nw_i \,.\, NONW_n + \beta^{nw}_{BORD} nw_i \,.\, BORDER_n + \beta^{w}_{NONW} nw_i \,.\, NONW_n \\ & + \beta^{w}_{BORD} nw_i \,.\, BORDER_n + \beta^{w}_{white} nw_i \,.\, WHITE_n + v_k + v_n + \varepsilon_{knmt} \end{aligned}$$

(5)

where w_i is the binary indicator that the owner is white and $NONW_n$; $BORDER_n$ are binary variables defining nonwhite and border areas (based on the percent nonwhite in the local neighbourhood). In this paper the model specification for religious composition in the Belfast market takes the same form. In this instance the predominantly catholic (>80% catholic), and predominantly protestant (<20% catholic) thresholds determine the preference of community/religious denomination, with tactile barriers such as peace walls also acting as a defined border.

Model Reduction and Stability

Inspection of the standardised residuals for both the linear and semi-log model forms shows relative "goodness of fit," thus accounting for neglected nonlinearities within the OLS specification. For model development, and to avoid misspecification (omitted variable bias), the inclusion of various property and locational characteristics can introduce multicollinearity and spatial dependence within hedonic modelling frameworks. Preliminary analysis highlighted issues pertaining to model structure (elevated Variance Inflation Factors) given the inclusion of neighbourhood characteristics which generally demonstrate spatial autocorrelation. To counteract this, a model reduction procedure has been employed to account for confounding variables bias/skewness. These procedures help account for multicollinearity (correlation) between spatial and neighbourhood variables in order to be able to include independent spatial and neighbourhood characteristics and control for, and isolate, the effects of peace walls (as much as possible). To redress the elevated variance inflation (VIF), and increase model robustness and stability, a model selection procedure was employed. The inclusion of additional estimators can enhance model performance, but this can contrive and distil the explanatory relationships between parameters, as well as culminate in excessively complicated model structure that is often difficult to interpret. In this regard, this research employs the most parsimonious model format whilst also maximising model performance. To select the optimal model structure, an information theoretic statistic, the Akaike Information Criterion (AIC), is computed. This statistic is premised on the maximum likelihood estimates of the model parameters where the probability of the observed data would be as large as possible. This relationship is expressed as:

$$AIC = -2In(L(\hat{\beta}|data) + 2K$$

(6)

where L($\beta|data$) is the log-likelihood function. In the regression setting, the estimates of β_i are based on least squares and the maximum likelihood estimates, which are identical. The estimates are based on maximum likelihood estimates of the model parameters, which provide an approximate AIC value[i]:

$$AIC = n + n\,In(2\pi) + \ nlog\left(\frac{RSS}{n}\right) + \ 2K$$

(7)

This multi-model inference procedure was applied to ensure the most appropriate explanatory variables were included in the modelling phase[5] with the selection procedure filtered by the AIC. The model inference was conditioned on fixed explanatory variables containing all spatial and neighbourhood characteristics, with the predictor floating variables comprising the structural variables, as this permitted the minimum AIC value and most parsimonious model for analysis. The initial results revealed that the most parsimonious model form excluded crime and unemployment neighbourhood variables—undoubtedly as they are confounding variables captured within the noble indicators that constitute the measure of multiple deprivation.

Time-Adjustment

Given the temporal nature of the data, the paper creates a time-adjusted sale price variable. In this regard, the sales data is adjusted to a common date in order to identify the underlying time trend. The index was created by regressing price (dependent) with sale month (independent), and dividing the "sale month" non-standardised beta coefficient by the mean price, thus giving an implied monthly growth rate as the basis of the index. The process was completed by calculating a new, time adjusted (or indexed) sale price (e.g. TASP) formulated by multiplying the sale price by the time adjustment factor (TAF). This resulted in a new attribute in the data, which is a time adjusted sale price, indicating a sale price indexed to the "tone" date for the appraisals. The tone date for the purposes of this research was the most recent month in the sample (December, 2014). In practice, the tone date would be an antecedent valuation date set prior to the legal effective date of a revaluation (often two years prior). Having accounted for the temporal nature within the data, the *TASP* is therefore applied as the dependent variable within regression.

[5]According to Burham and Anderson (2002, 2004), if the value of δAIC is higher than 7, the model has a relatively poor fit relative to the best model; whereas a value less than 2 indicates that a model is equivalent to the minimum AIC model.

The descriptive statistics for the final model specification are evidenced in **Table 2**. The base model comprises a terrace property of interwar period (1919-1939), privately built, comprising oil heating, three bedrooms, no garage and located in ward 49 (Windsor Ward) which is in a mixed neighbourhood and greater than 2.5 kilometres away from a peace wall, and 3 kilometres from the CBD with a multiple deprivation ranking >70 decile.

Table 2

Descriptive Statistics

	Min.	Max.	Mean	Std. Dev
Sale Price	33500	300000	104906	48863
In(*P*)	10.42	12.61	11.467	.4239
Area (Size m^2)	30	242	91.97	28.69
Bedrooms	1	6	2.76	.728
Garage	0	1	.23	.421
Heating Type	1	4	2.74	.711
City Centre Business District	600	5200	3618.0	1196.2
MDM Rank	5	5022	2662.5	1537.5
Peace Wall	<100	4000	2500.6	900.4

Results and Discussion

Spatial religious segregation and its impact on the marginal pricing of Belfast housing was examined through a series of initial models, with further models measuring segregation as a consequence of a physical tactile barrier (peace walls). The initial model specifications show area (size) to be the most important coefficient (t = 57.51, p<.000; t =50.48, p<.000), with all other structural attributes statistically significant and conform to *a priori* expectation (**Table 3**). The models reveal the period of construction to all comprise negative coefficients which is generally explained by the complex housing intra-relationship between property sale price, size, type and age.

Table 3

Base Regression Model

	Linear Model		Semi-log Model			
	B	*t*	*B*	Exp	% Effect	*t*
(Constant)	36664.72	15.845*	11.005			545.797*
AREA	1002.903	57.51*	.008	1.008	.008	50.480*
Apt	33218.65	19.099*	.284	1.329	.329	18.760*
Sdt	13650.08	12.205*	.168	1.183	.183	17.236*
Det	47203.67	25.759*	.354	1.424	.424	22.157*
Social	-13468.4	-9.164*	-.160	.852	-.148	-12.481*
Gar	368.91	0.386	.017	1.017	.017	2.070**
Elec	-521.707	-0.333	-.012	.988	-.012	-.888
Solid	166.832	0.13	.001	1.001	.001	.105
Gas	-867.059	-0.964	-.008	.992	-.008	-1.056
Pre1919	-10645.8	-8.846*	-.081	.922	-.078	-7.771*
Post war	-3942.74	-3.192*	-.005	.995	-.005	-.422
Early modern	-2340.42	-1.539**	.017	1.017	.017	1.281
R^2	0.662		0.690	.640	0.618	
Adj. R^2	0.658		0.686	.639	0.616	
F	231.542		229.067	472.770	421.965	
N	3,842		3,842			

Incorporating spatial dynamics into the modelling structure captures some interesting market dynamics for price determination. The model development accounted for location and socio-economic characteristics, such as deprivation. The inclusion of the measure of multiple deprivation coefficients clearly illustrates that properties located in wards with high deprivation within the Belfast market have a significant reduction in value. This is evidenced in the semi-log model which indicates up to a 22.8% negative pricing effect. Wards that comprise lower levels of multiple deprivation <50 percentile show a positive relationship with sale price of between 1% and 8%, with the lowest decile (90 percentile) displaying a sizeable positive effect. Factoring in religious composition presents some interesting insights. Across all the sales price information, and the geographic extent of the Belfast housing market, areas that are predominantly protestant in religious composition exhibit a negative

(£27,487) relationship with price (t = 17.043, p<.000), equating to a price differential of 23.8 % (t = 19.613, p<.000), as evidenced by the semi-log coefficient (**Table 4**). Similarly, the marginal pricing of property located in areas comprising a predominantly catholic populace also exhibit negative statistically significant coefficients in both model specifications significant at the 99% level. Unsurprisingly, the analysis shows areas classified as segregated, based on religious composition, to have a manifest negative pricing effect on property values, having accounted for location and spatial characteristics.

Table 4

Regression Models Accounting for Spatial Factors and Religious Composition

	B	***t***	***B***	***t***	**exp**	**% effect**
(Constant)	15407.488	6.962*	10.763	544.355*	-	-
Area	1022.900	47.489*	.008	41.018*	1.007925	0.00792
Apt	41799.560	20.653*	.365	20.204*	1.441029	0.44102
Sdt	39274.614	18.197*	.270	14.026*	1.310587	0.31058
Det	4971.814	3.906*	.079	6.981*	1.082627	0.08262
Social	-17064.388	-9.755*	-.188	-12.041*	0.828457	-0.1715
Gar	-90.713	-.078	.011	1.028	1.010754	0.01075
Elec	-51.828	-.027	-.012	-.690	0.988178	-0.0118
Solid	-78.245	-.071	.000	.039	1.000388	0.00038
Gas	580.830	.367	.004	.276	1.003905	0.00390
Pre1919	-4940.898	-3.477*	-.013	-.989	0.987517	-0.0124
Post1980	3129.424	1.419	.083	4.208*	1.086445	0.08644
Postwar	-3133.368	-2.151**	.016	1.207	1.015834	0.01583
Early Modern	-1999.105	-1.096	.036	2.239**	1.037151	0.03715
CBD<600	2938.853	.683	.034	.895	1.035	0.035
CBD<1000	8306.283	2.368**	.127	4.081*	1.136	0.136
CBD<2000	3806.375	2.521**	.056	4.162*	1.057	0.057
CBD<4000	-9139.149	-6.484*	-.085	-6.812*	0.918	-0.082
CBD<5000	-11667.370	-7.016*	-.116	-7.876*	0.890	-0.11
CBD>5000	-10794.607	-6.244*	-.083	-5.385*	0.921	-0.079
<20Catholic _dep1	-5346.958	-2.154**	-.104	-4.708*	0.900859	-0.0991
<20Catholic _dep3	7070.125	1.921	.036	1.107	1.037071	0.03707
<20Catholic _ dep4	416.193	.183	.016	.789	1.0162	0.0162
<20Catholic _ dep5	-18424.735	-2.540**	-.112	-1.734	0.893711	-0.1062
<20Catholic _ dep6	8115.797	2.795*	.146	5.623*	1.157065	0.15706
<20Catholic _ dep7	12865.389	4.912*	.211	9.014*	1.234815	0.23481

<20Catholic _ dep8	14806.759	2.775*	.187	3.918*	1.205384	0.20538
<20Catholic _ dep9	20109.875	8.256*	.267	12.287*	1.306545	0.30654
<20Catholic _ dep10	35657.906	13.125*	.357	14.727*	1.42971	0.4297
>80Catholic _dep2	3414.065	1.084	.054	1.903	1.055034	0.05503
>80Catholic _dep3	11425.996	2.581*	.154	3.899*	1.166763	0.16676
>80Catholic _dep4	2788.047	.662	.062	1.662	1.06449	0.0644
>80Catholic _dep6	-4978.075	-.669	-.036	-.537	0.964894	-0.0351
>80Catholic _dep8	18087.964	2.420**	.202	3.028*	1.224109	0.22410
<20Catholic	-27487.468	-17.043*	-.272	-19.613*	0.72336	-0.2381
>80Catholic	-33839.512	-14.097*	-.276	-13.358*	0.851997	-0.2411
R^2	0.713		0.701			
Adj. R^2	0.706		0.694			
F	478.12*		434.528*			
N	3,842		3,842			

Peace Walls and Segregation

The pricing effect "between" the religious divide is evidenced in **Table 5**. At the more local market level, distance bands (250 metres) radiating from each side of the peace walls show housing closer to peace walls on the predominantly protestant boundaries to have a heavier price discount (-25.6%) in comparison to the predominantly catholic boundaries (-14.5%).

Table 5

Price Effect in Segregated Markets Proximal to Peace Walls

	Linear Model		**Semi-Log Model**			
	B	*t*	*B*	*t*	exp	% Effect
(Constant)	108849.3	130.514*	11.514	1607.191*	-	-
>80Catholic _PW250	-12018.658	-2.371**	-.135	-2.985*	0.8550	-.145
>80Catholic _PW500	-13524.639	-2.982*	-.146	-3.217*	0.8598	-.140
>80Catholic _PW750	-11964.194	-2.994*	-.155	-3.350*	0.8706	-.129
>80Catholic _PW1000	-12715.059	-2.879*	-.147	-3.224*	0.8629	-.137
>80Catholic _PW1500	-15018.031	-5.215*	-.273	-5.640*	0.8452	-.155
>80Catholic _PW2000	-1474.469	-1.090	-.049	-1.028	0.9666	-.033
<20Catholic _PW250	-26101.620	-5.270*	-.164	-6.643*	0.7438	-.256
<20Catholic _PW500	-21505.572	-5.262*	-.149	-5.875*	0.8058	-.194
<20Catholic _PW750	-30859.664	-7.871*	-.234	-9.183*	0.7234	-.277
<20Catholic _PW1000	-27956.051	-6.792*	-.220	-8.701*	0.7246	-.275
<20Catholic _PW1500	-15264.811	-4.755*	-.154	-5.786*	0.8461	-.154
<20Catholic _PW2000	-5023.618	-1.400	-.014	-1.713**	0.9462	-.0139

Notes: a. Model presented in its most parsimonious format; *significant at the 1 % level

Further examination of the composition of housing stock and sales price differentials between the respective divided communities proximal to the peace wall reinforces the previous analysis. The property stock on the predominantly protestant side is notably older at each wall proximal distance band. This is particularly evident in the oldest age category of property (*Pre-1919*) across the distance bands, whereas the predominantly catholic market has substantially higher early modern type housing stock (**Table 6**). Moreover, this is also evident of the average price of older terrace properties across age brackets. Pre-1919 terrace properties show a price differential of £6,744, with post-war showing a sizeable difference of £16,916. Interestingly, early modern properties on the predominantly protestant "side" sell for a marginal £1,500 difference—although they constitute a large amount of the stock on the predominantly catholic side in comparison to the predominantly protestant equivalent. This is perhaps due to development opportunities remaining truncated, or possibly more reflective of existing and well established kinship ties and traditional community structures, as opposed to a more market dynamism in terms of stock revitalisation and population migration on the predominantly catholic market areas. Indeed, the results point towards house prices being

stagnated on the predominantly protestant side as a consequence of socio-structural embedded poverty coupled with limited urban regeneration or redevelopment of exiting lower priced terrace housing stock. Whilst older property is not necessarily priced lower in the Belfast market, analysis of sales prices does confirm that older wall proximal properties achieve notably lower prices in the predominantly protestant enclaves (**Table 6**).

Table 6

Percentage of Properties Based on Age and Distance Bands Each Side of PW

>80Catholic	*Pre1919*	*Interwar*	*Post war*	*Early modern*	*Post1980*	*Total*
<250	16.7%	37.5%	29.2%	12.5%	4.2%	100%
251-500m	9.7%	38.7%	19.4%	25.8%	6.5%	100%
501-750m	7.1%	42.9%	35.7%	11.9%	2.4%	100%
Mean Terrace Price	*69125*	*62772*	*93666*	*71250*	-	*74203*
<20Catholic	*Pre1919*	*Interwar*	*Post-war*	*Early modern*	*Post1980*	*Total*
<250	21.8%	44.6%	24.8%	4.0%	5.0%	100%
251-500m	19.6%	37.4%	33.1%	6.7%	3.1%	100%
501-750m	13.7%	51.6%	23.1%	8.2%	3.3%	100%
Mean Terrace Price	*62381*	*53912*	*76750*	*72750*	-	*66448*

These initial results suggest a much more patchwork quilt effect of the pricing structure of houses located in areas of predominantly catholic segregation, where the adjacency to peace walls has seemingly not impacted negatively on the overall pricing structure. In contrast, areas with predominantly protestant communities suggests that segregation appears to be much more affected in terms of a price decay. Further decomposition premised on the build type suggests dichotomous markets are evident in each respective segment of the peace wall divide. In areas of predominantly catholic communities, privately built housing shows a 7.2% price decrease, with predominantly protestant areas demonstrating a 6.2% decrease. Pertinently, public sector constructed housing exhibits contrasting results. Areas which are predominantly catholic reveal a 2.2% price reduction, however predominantly protestant communities show a 20.6% decrease. This is a significant finding given the often suggestive and anecdotal evidence pertaining to the influence of peace walls in terms of restricting investment opportunities and inhibiting physical regeneration. Social housing investment has tended to “pepper-pot” the predominant catholic regions of

peace walls based on the higher level of social housing demand, waiting lists and the elevated slum clearance of traditional social and terrace housing for urban renewal and urban regeneration.

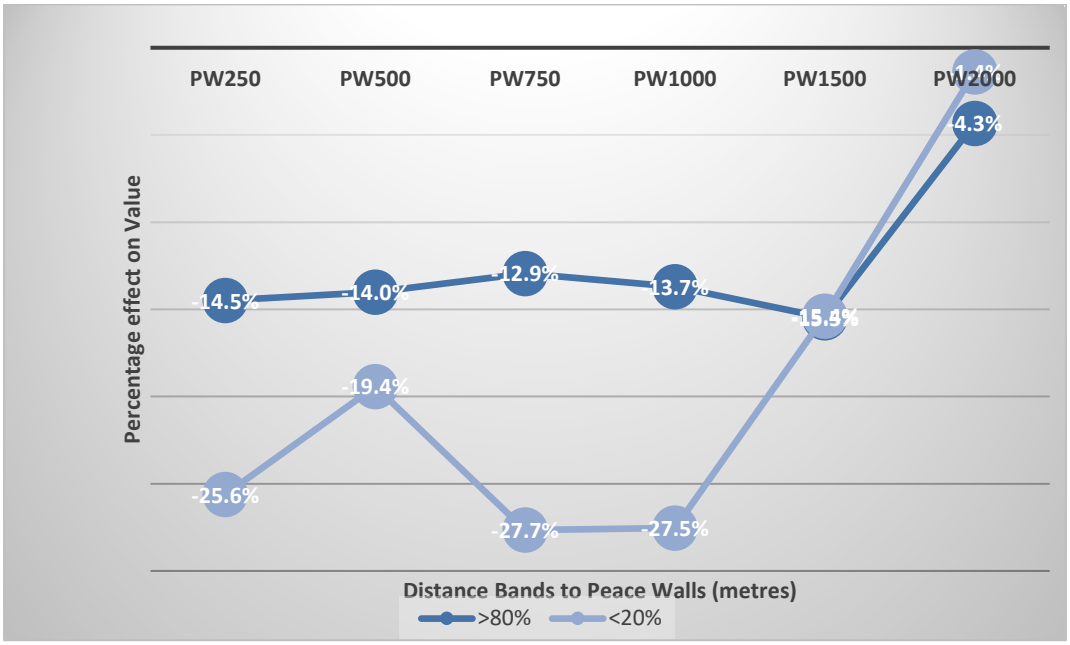
It is pertinent the findings are seemingly in accordance with other qualitative research conducted by Bryne et al. (2012, 2015), who examined attitudes and perceptions of peace walls with residents living in close proximity to peace walls in Belfast and another general sample of the wider population. Their findings illustrated that 70% of local residents deemed that peace walls are still necessary for safety and protection from violence; nonetheless, they frame the issue of peace walls in relation to violence, as opposed to one of segregation. An important finding highlighted in their research related to the financial implications of the peace walls in terms of restricting investment opportunities as outlined by Bloomberg (as cited in Macaulay, 2008) and barriers to physical regeneration (Jarman, 2008). Significantly, the findings emerging from this research demonstrate that peace walls have clearly had a more detrimental and adverse effect on the consistency and application of policy and practice. Indeed, the existence of the peace walls appear to have occasioned *or* facilitated differential practices in housing strategies either "side of the wall."

Given relatively synchronous and symmetrical land and property markets, the results arguably suggest a distortion in the diffusion of market signals and indeed responses to the market—habitually providing an effective "hard barrier" to policy implementation, particularly investment practices (regeneration) that appear to have not been uniformly applied, and in that sense are "out of sight, out of mind." This has, as highlighted by Murtagh (2011a), ostensibly fostered and buttressed complex ethnocratic patterns of segregation. Moreover, the findings emerging in this research serve to reinforce this analysis, as there appears to be deep socio-spatial effects—manufactured by existing patterns of segregation and emerging contemporary patterns of segregation "each side" of the peace walls—being nourished by the persistence of these fortified hard barriers. Extensive challenges have been illumined for urban and social housing and fiscal/economic policy, and indeed the direction it should take.

These findings can be demonstrated by the differential effect on polarised communities as the effect of peace walls ebb. The results depicted in **Figure 3** demonstrate that there is a differential distance decay effect. House prices are negatively affected close to the walls for both communities—but markedly worse for the areas which are predominantly protestant. There is a rapid normalisation effect for both communities beyond the immediate wall proximal area. However, whilst the predominantly protestant communities' trend reverts

asymptotically, there does appear to be a persistent endemic negative pricing effect for catholic areas.

Figure 3. Differential Distance Decay Effects of Peace Walls and Religious Segmentation



Conclusions

Previous research has examined the pricing effects of tactile barriers such as peace walls on property value in the Belfast housing market. The objective of this research was to further build upon and understand the influence of segregated communities on house prices, as well as investigate whether there exists a price differential based on the presence of hard delineated barriers that blot the Belfast landscape and normal housing market activity. Ultimately, whilst there is evidence of similarity and replication of spatial socio-economic and physical characteristics in the abutting market areas, they are by no means symmetrical—and are indeed *asymmetrical*. It would appear that the peace walls manifest a discontinuity effect that facilitates independent, yet somewhat encapsulated, submarkets to coexist, as the residents of the respective communities would be unlikely to seek housing across the boundary, and sales on either side of the walls are not substitutable comparables for valuation purposes, impacting on market processes. It would appear that the hard barriers and limited permeability structurally alter the market dynamic, to an extent, reflecting existing behavioural and cultural choices, and to a certain degree exacerbates the market effects of

such choices. The peace walls prevent the interface "meandering" through time as occupation changes—to an extent intended to offset fears of "encroachment," have ultimately locked communities into a "death spiral" of distrust and animosity. In this regard, peace walls are an anachronistic symbol of the failures of the past.

The findings emerging from the research demonstrate that peace walls have clearly had a more detrimental and adverse effect on the consistency and application of policy and practice. Indeed, the existence of the peace walls appears to have occasioned or facilitated differential practices in housing strategies either "side of the wall." As the adjoining communities have both literally and metaphorically turned their backs on each other, so to has policy which has tended to focus on one community or the other, neglecting—or perhaps failing—to achieve a holistic overview. This somewhat myopic policy focus has now manifested itself in a new phase of segregation evident in the nature and pricing of the housing stock, particularly in areas predominantly composed of a protestant populace. That said, the level of protectionism and enmity evident within the protestant community has equally served to heighten this policy problem.

Moreover, by truncating the natural geographic hinterlands of service providers, both public and private, the peace walls are responsible both for duplicating (public) service provision such as schools and limiting market and efficiency opportunities, in terms of accessible infrastructure and public realm. In this regard local communities are restricted to access of proximal services given the nature of the existing structures, which prohibit easy movement and limit choice. As a result, this research clearly illustrates that proximity to peace walls is a source of extreme inefficiency. Given the relatively deprived nature of the communities, this inefficiency exacerbates already stretched public finance demands and market failure. Moreover, in a period of tightening public finances and the current austerity agenda, it is difficult to see how such a situation can be countenanced moving forward. Given that the walls also seem to multiply the economic effect, via the housing market, the existence of peace walls does seem to represent an anachronism in terms of societal normalisation, cohesion, and efforts to rebalance the economy. The results stemming from the research suggest that if the peace walls are deemed a necessary evil for peace keeping purposes, policy in the vicinity needs to undergo a process of "re-imagination" to discern how communities can effectively share contested space and scarce resources. Crucially, urban policy must avoid further structural reinforcement of pre-existing divisions and adopt a broader more holistic perspective which does more than "peep over the wall."

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Appendix 1 Spatial Wards

WARD2	**-43329.7**	**-7.756***	**-.517**	**.596**	**-.404**	**-10.625***
WARD3	-34899.4	-14.341*	-.317	.728	-.272	-14.956*
WARD4	-41091.4	-10.727*	-.411	.663	-.337	-12.320*
WARD5	-23673	-10.012*	-.207	.813	-.187	-10.027*
WARD6	-71235.4	-22.762*	-.835	.434	-.566	-30.608*
WARD7	-38938.7	-13.137*	-.393	.675	-.325	-15.206*
WARD8	-65734	-19.026*	-.708	.493	-.507	-23.516*
WARD9	-33235.2	-12.402*	-.338	.713	-.287	-14.470*
WARD10	-52307.6	-16.338*	-.671	.511	-.489	-24.066*
WARD11	-46068.2	-18.73*	-.496	.609	-.391	-23.135*
WARD12	6071.823	2.353**	.028	1.028	.028	1.249
WARD13	-48346.5	-14.138*	-.486	.615	-.385	-16.299*
WARD14	-50722.6	-15.315*	-.468	.626	-.374	-16.226*
WARD15	-23144.5	-8.037*	-.229	.796	-.204	-9.116*
WARD16	-55224.8	-15.933*	-.510	.600	-.400	-16.902*
WARD17	-59518.2	-17.158*	-.596	.551	-.449	-19.719*
WARD18	-37427.5	-11.472*	-.386	.680	-.320	-13.571*
WARD19	-82663.1	-6.294*	-.884	.413	-.587	-7.721*
WARD20	-58215.4	-10.463*	-.688	.502	-.498	-14.198*
WARD21	-31857.7	-5.205*	-.314	.730	-.270	-5.889*
WARD22	-37360.4	-12.074*	-.340	.711	-.289	-12.625*
WARD23	-29044.8	-8.881*	-.291	.747	-.253	-10.225*
WARD24	-46545.6	-15.028*	-.536	.585	-.415	-19.875*
WARD25	-30031.2	-7.685*	-.262	.769	-.231	-7.707*
WARD26	-59862	-10.685*	-.663	.515	-.485	-13.576*
WARD27	-44726.1	-13.28*	-.397	.672	-.328	-13.536*
WARD28	-66643.7	-16.351*	-.627	.534	-.466	-17.662*
WARD29	-37258.6	-13.906*	-.374	.688	-.312	-16.016*
WARD30	-35686.1	-11.258*	-.347	.707	-.293	-12.565*
WARD31	-41074.7	-9.91*	-.383	.681	-.319	-10.618*
WARD32	-70905.1	-18.337*	-.728	.483	-.517	-21.598*
WARD33	13000.66	4.275*	.009	1.009	.009	.341
WARD34	-48774	-7.27*	-.590	.554	-.446	-10.089*
WARD35	-39383.2	-15.416*	-.356	.701	-.299	-15.978*
WARD36	-30480.6	-13.27*	-.289	.749	-.251	-14.450*
WARD37	-12854.6	-4.226*	-.144	.866	-.134	-5.420*
WARD38	-20277.9	-7.112*	-.224	.800	-.200	-8.996*
WARD39	-94658.9	-9.227*	-1.001	.368	-.632	-11.195*
WARD41	-16012	-5.317*	-.205	.815	-.185	-7.796*
WARD42	22016.8	9.07*	.094	1.098	.098	4.431*
WARD43	-46113.9	-16.908*	-.482	.617	-.383	-20.297*

WARD44	-53093.2	-15.149*	-.632	.532	-.468	-20.688*
WARD45	-22861.1	-7.611*	-.242	.785	-.215	-9.239*
WARD46	-36777.4	-5.801*	-.352	.704	-.296	-6.365*
WARD47	-58774.9	-15.369*	-.566	.568	-.432	-16.994*
WARD48	-30272.1	-5.458*	-.311	.733	-.267	-6.429*
WARD50	-47128.2	-17.547*	-.515	.597	-.403	-22.022*
WARD51	-65342.7	-12.558*	-.831	.436	-.564	-18.327*
WARD53	-22172	-7.508*	-.207	.813	-.187	-8.043*

Endnotes

The RSS is the sample residual sum of squares and K is the number of estimable parameters in the model including the intercept and the residual variance $\hat{\sigma}^2$. This balances error with model complexity (increasing$K$), with the optimal model comprising the minimum AIC score. This equation gives the small sample approximation (AIC_C), that converges to standard AIC for large samples. The value of $\sigma 2$ is used as a proxy for the likelihood of the model given the data. The AIC values for the various models are transformed to ΔAIC, which is the difference between AIC of each model and the minimum AIC found for the set of models compared.